Fisheries Report 03-05

SURVEY OF THE TROUT FISHERY IN THE WATAUGA RIVER
March – October 2002




A Final Report Submitted To

Tennessee Wildlife Resources Agency
Nashville, Tennessee

By

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EXECUTIVE SUMMARY

1. The fishery in the 28 km of the Watauga River below Wilbur Dam was investigated between March and October 2002 using a roving creel survey. The river was last surveyed in 1998. In 2002 the river was stocked with 17,562 catchable ($\geq$ 200 mm total length) brown trout, 54,812 catchable rainbow trout, and 179,047 fingerling rainbow trout. Fry and fingerling brook trout (n = 174,166) were also stocked in 2002.

2. Fishing pressure over the 8-month survey totaled 108,584 h (90% confidence interval, $\pm$ 11,437). Fishing pressure over comparable seven-month periods was 50% higher in 2002 than in 1998. The estimated number of fishing trips during the 2002 survey (20,882 trips) was actually slightly lower over a comparable period in 1998 because mean trip length increased between 1998 (3.2 hours) and 2002 (5.2 hours).

3. The catch rate for trout was high, averaging 1.6 fish/h. The harvest rate was low (0.16 fish/h). Between 1998 and 2002 the catch rates increased and harvest rates decreased ($P \leq 0.0013$; Wilcoxon two-sample test).

4. The estimated catch of rainbow trout was 146,795 fish, which was twice the number reportedly caught in 1998 over a comparable period. The number of rainbow trout harvested in the 2002 survey (22,937) was only 16% of the total number caught. Over comparable seven-month periods, the estimated harvest of rainbow trout was statistically similar between 1998 (16,790 fish) and 2002 (20,459 fish; $P > 0.10$)

5. The number of brown trout harvested (3,499 fish) was 15% of the number reportedly caught (24,015 fish) during the 2002 survey. Over comparable seven-month periods, the estimated harvest of brown trout was statistically similar ($P > 0.10$) between 1998 and 2002.

6. The number of trout harvested by anglers who had completed fishing when interviewed averaged 0.23 (SE = 0.05) trout per trip. Those same anglers reported catching an average of 10.1 (SE = 0.57) trout per trip.

7. Based on length-frequency distributions and the expanded estimates of harvest, about 183 rainbow trout and 56 brown trout longer than 40 cm (~ 16 inches) total length were harvested during the 2002 survey. No brook trout were observed in the creel and anglers reported catching only 34 brook trout (unexpanded estimate).

EXECUTIVE SUMMARY - continued

8. The period between 1998 and 2002 saw a large influx of non-residents fishing the Watauga River. In the 2002 survey, out-of-state residents represented 32% of all interviewed anglers, compared to 10% in 1998. North Carolina residents outnumbered the residents of 26 other states combined. Most Tennessee anglers lived in Carter (45%) and Washington counties (34%). Sullivan and 23 other counties combined represented 8% and 13%, respectively of the other counties where Tennessee anglers resided.

9. The percentage of interviewed anglers using bait fell from 68% in 1998 to 36% in 2002. The percentage of interviewed anglers using flyfishing gear rose from 18% in 1998 to 47% in 2002.

10. The Watauga River trout fishery changed substantially between 1998 and 2002. What was described as an underutilized fishery in 1998 became one of the most heavily fished trout rivers in the state in 2002. Whereas anglers using bait numerically dominated the fishery in 1998, more anglers used artificial lures and flies than bait in 2002. The percentage of anglers using flyfishing gear more than doubled in 2002 and the percentage of anglers traveling from out-of-state to fish the river tripled in 2002. Much of the increases in pressure and use of flyfishing gear was linked to the opening of a private campground and day-use area at the head of the Quality Zone.

11. The catch rate reported by anglers was higher in 2002 than in 1998 and was very high in relation to the number of trout stocked each year and the number observed carrying over from year to year. The high catch rates suggest that many fish are being caught more than once.

12. One of the biggest changes in the fishery since 1998 was the increase in guided fishing activity observed in 2002. The amount of guided fishing on the Watauga River is one of the highest in the state, but additional data are needed to confirm this preliminary conclusion.

INTRODUCTION

The Tennessee Wildlife Resources Agency (TWRA) intensively manages the trout fishery in the Watauga River below Wilbur Dam in east Tennessee. Between March and October 2002, a roving creel survey was used to examine fishing pressure and harvest rates by trout anglers fishing the Watauga River. Attributes of the anglers using the resource for that 8-month period were also examined. The tailwater was last surveyed in 1998 (Bettoli 1999) and the results of this 2002 survey will be compared to findings in the 1998 survey.

STUDY AREA

The Watauga River trout fishery is located below Wilbur Dam, which is located at river kilometer 55 in northeast Tennessee by the town of Elizabethton (Figure 1). Wilbur Dam is located just 4 km below Watauga Dam; thus, discharges from Wilbur Dam mirror the discharge patterns from Watauga Dam. Wilbur Dam is equipped with three turbines, each capable of releasing 8.6 m^3/s (305 cfs) and an additional turbine that releases 50 m^3/s (1,765 cfs). The Watauga River flows northwest and empties into one arm of Boone Lake.

The Watauga River below Wilbur Dam was severely polluted from industrial sources in the 1960s and 1970s. When water quality improved in the 1980s, TWRA biologists initiated a trout stocking program. Historically, dissolved oxygen concentrations in the discharge from Watauga Dam (and Wilbur Dam) were seasonally depressed (Scott et al. 1996); thus, TVA initiated a program to improve water quality in the Watauga River. In 1991, a minimum flow of 3 m^3/s (107 cfs) was established in the Watauga River by pulsing one of Wilbur Dam's four turbines for one hour every four hours. Hub baffles were installed on the Watauga Dam turbines in 1991 and turbine venting helped elevate D.O. concentrations in the Watauga Dam discharges, which then run through Wilbur Dam. In years when D.O. concentrations fall below 6.0 mg/l, they

usually did not drop below 4.0 mg/L in the river below Wilbur Dam (E. Scott, TVA, personal communication).

The Watuaga River is managed for trout between Wilbur Dam and the town of Watauga, a distance of 26 river kilometers (16.5 miles). In 2002 the TWRA and the U.S. Fish and Wildlife Service stocked 54,812 catchable (> 200 mm total length) rainbow trout and 17,562 catchable brown trout. Fingerling rainbow trout (n = 179,047), and fry and fingerling brook trout (n = 174,166) were also stocked in 2002. The Watauga River is one of only three tailwaters in Tennessee that is managed with special trout regulations. The reach of river between Smalling Bridge and the bridge at the town of Watauga (~ 4 km) was established as a Quality Zone in 1988 (Bivens et al. 1997). Anglers are required to use only artificial lures, they can only harvest two trout per day, and the minimum size limit is 356 mm (14") total length in that zone. The Watauga River is low in dissolved ions; conductivity below Wilbur Dam ranged from 53-78 micromhos/cm and alkalinity was about 40 ppm as $CaCO_3$ (Bivens et al. 1997; Bivens et al. 1998). Below the confluence of Stony Creek and the Doe River, conductivity increased to 130 - 170 micromhos/cm and alkalinity increased to 50-65 ppm. The relatively soft water of the Watauga river is reflected by the macroinvertebrate community, which is dominated by tolerant emphemeropteran and trichopteran species downriver and ephemeropteran and dipteran species closer to the dam (Bivens et al. 1998). In 1993-1995, TVA's Tailwater Benthic Index rated the macroinvertebrate community of the Watauga River below Wilbur Dam as "fair/good" or "good"(Scott et al. 1996).

The fish community of the Watauga River is dominated by trout, although large populations of suckers (Hypentelium nigricans, Catostomus commersoni), and sculpins (Cottus carolinae, C. bairdi) are present (Bivens et al. 1998). In addition to sculpins, fish prey available to large trout also include dace (Rhinichthys atratulus), logperch (Percina caprodes) and gizzard shad (Dorosoma cepedianum).

Some natural reproduction by rainbow trout and brown trout occurs in the Watauga River (Bettoli 1999). Although water quality and discharge patterns are conducive to spawning, the substrate in the river is heavily armored and comprised of a

poor distribution of particles sizes relative to what salmonids need for redd construction and egg incubation (Banks and Bettoli 2000).

As on other east Tennessee tailwaters, guided float fishing trips are common on the Watauga River. In addition, several outfitters provide rafts and shuttle service for clients who wish to float the river and engage in non-fishing activities. Boating activities on the river are promoted by special recreational releases provided by TVA; between Memorial Day and Labor Day, at least one turbine runs continuously between 1:00PM and 7:00 PM, Monday through Saturday (Randy Kerr, Tennessee Valley Authority, personal communication).

In February 2000, a fire in a factory along the banks of the Watauga River led to the discharge of toxic chemicals into the river at a point about 14 km below Wilbur Dam. The resultant fish kill was complete and extended at least 12 km into the headwaters of Boone Lake. The reach of river that suffered the fish kill included the Quality Zone. Within several weeks of the spill, the TWRA initiated an aggressive stocking program to help the fishery recover faster than might otherwise happen.

METHODS

A stratified, uniform probability roving creel survey was conducted between March 1 and October 31, 2002. The survey was designed to collect information about the amount of fishing pressure the tailwater was receiving, the catch and harvest rates of rainbow trout and brown trout, and the catch per unit of effort by anglers. The sample design was modeled closely after the survey design used by TVA to monitor fishing pressure on the Watauga River between the late 1980s and 1997; the present survey followed the same general design employed by Bettoli (1999) in the 1998 survey.

The survey was stratified by month and kind-of-day. An average of 10 weekdays and 6 weekend days were surveyed each month. Sampling days were divided into equal work periods based on sunrise and sunset times with equal probabilities of sampling the AM or PM work shifts. The clerk counted anglers on the river once each work shift. The time to start the count was randomly selected from a list of possible start times for each shift, beginning at daylight (or midday) and every 30 minutes thereafter until 1 h before

the end of the shift. The counts were adjusted upwards when more boat/raft trailers were counted than boats by adding the mean number of anglers per boat (mean party size per boat = 2.02) for each boat that was presumed to be on the river, but was not observed during the instantaneous count. Canoe racks on cars parked at ramps were also included in the counts of trailers.

In the 1998 survey, access to the Quality Zone was restricted principally to float-through anglers; private property lined the banks of the river in the Quality Zone and shore and wading anglers were scarce. However, in 2002 a new private campground opened just downstream of Smalling Bridge, at the head of the Quality Zone. More importantly, a day-use area allowed anglers who were not camping to park their vehicles (for a daily or annual fee) and wade fish the Quality Zone. This day-use area got heavy use, but most anglers walked downstream from where they parked and out of sight of the clerk. Therefore, the number of vehicles parked in the day-use area was used to estimate the number of anglers fishing but not visible to the clerk when he visited the day-use parking area. Based on exit interviews at that day-use area, the average party size was 1.7 anglers; therefore, the number of cars at the day-use area was multiplied by 1.7 (assuming one party per vehicle) and that product was added to the number of anglers the clerk saw on the entire river. The number of anglers that were observed fishing the river above the day-use parking area was recorded in the usual manner.

During the instantaneous count, the clerk separately tallied anglers as to whether or not they were using flyfishing gear. Using 7 X 50 Steiner military-grade binoculars, the clerk was able to easily see what type of fishing method (spinning tackle or fly rods) anglers employed, even from great distances. In all previous surveys conducted by Tennessee Technological University researchers, the percentage of anglers who flyfished a river was estimated from interviews. In this survey, that metric was separately calculated based on counts and interviews.

Before and after the count, the clerk interviewed anglers. If anglers agreed to be interviewed, they were asked how long they had been fishing, whether they were finished fishing, and how many trout they had caught. Anglers were asked their state of residency and Tennessee residents were also asked for their county of residence. The clerk also recorded the method of fishing being used by each angler. Finally, the clerk measured

the total lengths (nearest cm) of any trout harvested. A copy of the interview sheet is provided in Appendix I.

Mean daily counts were expanded to estimate effort in each stratum (i.e., kind-of-day), then pooled to estimate effort during each two-week period following the methods of Pollock et al. (1994). Average catch and harvest rates were measured using the mean of ratios method, which is recommended for roving creel surveys (Pollock et al. 1997). Catch and harvest rates were calculated for all parties that had been fishing for at least 30 minutes before being interviewed. The catch and harvest of each trout species was then estimated each month. Standard errors of catch, harvest, and effort each month were calculated according to Pollock et al. (1994). A spreadsheet performed all necessary calculations and calculated 90% confidence intervals around each estimate. The pooled variance for total pressure, total harvest, and total catch of each species was calculated using the mean-square-successive-difference-between-periods procedure. The square root of the variance was multiplied by 1.6 to estimate 90% confidence intervals.

RESULTS and DISCUSSION

Fishing Pressure

Fishing pressure over the eight-month survey totaled 108,584 h (90% confidence limits $\pm$ 11,437; Table 1). Average trip length was 5.2 h (n = 412; SE = 0.14); thus, anglers made an estimated 20,882 trips to the tailwater in the 2002 survey. Over a comparable seven-month period (April – October), fishing pressure was 50% higher in 2002 (97,524 h) than in 1998 (65,188 h; $P < 0.10$). Much higher pressure in 2002 did not translate into more trips because average trip length increased significantly ($P < 0.0001$; Wilcoxon test) between 1998 (3.17 h) and 2002 (5.2 h). The estimated number of trips over comparable seven-month periods actually decreased between 1998 (20,564 trips) and 2002 (18,754 trips), but each trip averaged about 2 hours longer in 2002.

Much of the observed increase in fishing pressure was due to improved access to the river at the River Bend campground near Smalling Bridge. Anglers were infrequently seen there during the 1998 survey. Anglers using the River Bend

campground and parking area to access the river contributed 26% of the estimated pressure the river received during the 2002 survey. If the counts of anglers at that area were disregarded, fishing pressure over comparable seven-month periods would have increased only 19% between 1998 and 2002.

A good way to relate the pressure a particular fishery receives relative to other tailwaters is to calculate the number of hours anglers fish it per week per unit area over comparable survey periods:

River	Start of 26-week Survey	Total Pressure (h)	Pressure (h) per hectare per week	Reference
Hiwassee	3/27/01	59,380	7	Luisi and Bettoli (2001)
Elk	4/ 4/95	14,340	10	Bettoli and Besler (1996)
Clinch	3/30/96	75,876	12	Bettoli and Bohm (1997)
Watauga	3/28/98	53,444	15	Bettoli (1999)
Caney Fork	3/29/97	61,853	17	Devlin and Bettoli (1999)
Watauga	4/ 1/02	87,787	19	This study
Caney Fork	4/ 4/95	74,534	21	Bettoli and Xenakis(1996)
S.F. Holston	4/ 1/97	84,119	36	Bettoli et al. (1999)

The 64% increase in mean trip length between the two surveys was due to more interviews of float-fishing parties. Parties fishing from boats, rafts, and canoes in 1998 represented only 12% of all interviews; that percentage jumped to 51% in 2002. The influence of increased boating activity was quite apparent during the randomly scheduled instantaneous counts. The clerk observed 424 boats (usually McKenzie-style drift boats or rafts) and 640 boat/raft trailers during 129 instantaneous counts in 2002. During the 1998 survey the clerks observed only 101 boats/rafts during 122 instantaneous counts. In 2002 an average of 4 or more boats were observed during weekend counts every month except August (Table 2). Trailer counts always averaged five or more during weekend counts. The counts of boat and raft trailers were probably a better reflection of actual boat use on the tailwater because several reaches of the river could not be seen from the creel

survey route and there were a limited number of launch and boat retrieval sites on the river. The most popular take-out points for rafts and trailers were upstream of the Persinger Bridge on the right-bank-descending (across from the old Johnson City water treatment facility) and across the street from the Johnson City wastewater treatment plant at the lower end of the tailwater (left-bank-descending). The TWRA recently graded and graveled the parking area at the Persinger Bridge site (no ramp yet exists), which should serve to make it even easier for rafters and boaters to use the river.

Based on interviews conducted during the 2002 survey, at least fifteen different outfitters or guide services were observed guiding clients on the river. Nine of the known guide services were based in North Carolina, three were Tennessee-based, two were Virginian, and one was a South Carolina outfit. These numbers do not reflect the number of trips each outfitter provided or the number of guides that each employed; those data were not collected. During the 2002 survey the clerk observed 129 different and recurring boat/raft trailers (based on license tags), of which 53 (41%) were known to be associated with guides, 14 were private, and the remaining 62 trailers could not be designated as private or commercial. These totals reflect trailers that were observed two or more times on the river during the survey period.

Catch and Harvest

The number of rainbow trout and brown trout that anglers said they caught (i.e., unexpanded estimates) totaled 12,037 and 1,427 fish, respectively. Anglers reported catching only 34 brook trout and none were observed in the creel. Due to the low incidence of brook trout in the creel, the catch data for brook trout were not expanded to estimate the total number caught over the survey period.

Anglers reported high catch rates throughout the survey. The pooled catch rate (all species; all parties fishing more than 30 minutes) averaged 1.6 trout/h (SE = 0.06, n = 1,468), which was significantly higher than the catch rate in 1998 (1.4 trout/h; Wilcoxon test: $P = 0.0013$). Conversely, the harvest rate was lower in 2002 (0.16 trout/h) than in 1998 (0.34 trout/h; $P < 0.0001$).

Over the entire survey, the estimated catch of rainbow trout was almost 147,000 fish, of which only 22,937 were harvested (Table 1). The difference between the number of rainbow trout harvested and the number caught represented a release rate of almost 85%, which was higher than the release rate in 1998 (75%). Over comparable survey periods (April-October), the catch of rainbow trout was twice as high in 2002 (135,104) as in 1998 (67,186). The large number of trout reportedly handled by anglers in 2002 is noteworthy because the number of trout of both species inhabiting the river in 1999 was estimated to be only 55,231 trout (Bettoli 1999). It should be noted that the reported catch is a "soft" number because there is no independent information to corroborate what anglers tell the clerk. However, if the veracity of interviewed anglers remained unchanged between 1998 and 2002 (i.e., they exaggerated or deflated their estimated catch to the same degree each year), the much higher catches reported in 2002 would reflect a higher incidence of fish being handled by anglers in 2002. The higher catch rates in 2002 could be the result of more rainbow trout being stocked in 2002 compared to 1998. About 12,000 more catchable rainbow trout and nearly 130,000 more fingerling rainbow trout were stocked in 2002 than in 1998. The size distribution of harvested rainbow trout (Figure 2) suggested that up to 10% of the harvest represented fish that were holdovers from previous years (i.e., 10% of harvested rainbow trout were longer than 30 cm).

The estimated catch of brown trout in 2002 was just over 24,000 fish and about 3,500 were harvested. The catch of brown trout over comparable periods (April – October) was very similar between 1998 (26,151) and 2002 (22,919), perhaps reflecting the fact that nearly identical numbers of brown trout were stocked in 1998 and 2002 (17,505 and 17,562 fish, respectively). The brown trout release rate (85%) was essentially unchanged from 1998 (82%).

The mean number of trout harvested by complete-trip anglers was 0.23 fish per angler per trip (n = 409 parties; Figure 3). Only 9% of complete-trip parties were observed harvesting trout and none were observed with more than the legal creel limit of 7 trout per angler per day. Although harvest rates were very low, catch rates were high and averaged 10.1 fish per angler per trip (Figure 3). Only 11% of complete-trip parties failed to catch a fish.

The total lengths of rainbow trout harvested by anglers reflected the size distribution of rainbow trout stocked throughout the year. Most (88%) of the rainbow trout observed in the creel were between 20 and 30 cm total length (Figure 2). The clerk measured four rainbow trout between 40 and 50 cm total length, which represented 0.8% of all rainbow trout measured. Thus, an estimated 183 trout (0.008 x 22,937 harvested fish) longer than 40 cm were harvested during the 8-month survey in 2002. Eighty-percent of the brown trout measured in the creel were less than 30 cm total length (Figure 2). Two brown trout observed in the creel were longer than 40 cm, representing 1.6% of all measured fish. Thus, about 56 (0.016 x 3,499) brown trout longer than 40 cm were harvested during the survey period

Most of the brown trout observed in the creel were harvested by anglers accessing the river at the ballfield and park in downtown Elizabethton, downstream of the highway 400 bridge (Table 3). Conversely, most of the rainbow trout were harvested by anglers fishing at and in the vicinity of the TWRA ramp at Blevins Bend.

Angler Characteristics

Sixty-eight percent of the 2,476 anglers interviewed on the Watauga River in 2002 were Tennessee residents (Figure 4), which was substantially lower than the 90% Tennessee residency rate observed in 1998. The influx of out-of-state anglers was due to visitation by North Carolina residents, who represented 18% of all interviewed anglers. South Carolina and Virginia residents accounted for only 5% and 2% of interviewed anglers, respectively; the remaining 7% were from 24 other states.

Nearly all (87%) of the Tennessee anglers who fished the Watauga River lived in the three counties closest to the river, particularly Carter and Washington counties (Figure 4). This percentage was nearly identical to the percentage (90%) observed for those same three counties in the 1998 survey.

In 1998, most anglers fished with bait (68%) and fly fishermen represented only 18% of all interviewed anglers. By 2002, the percentage of interviewed anglers using bait dropped by about half to 36% and the percentage of anglers using flyfishing gear increased to 47%. Increased prevalence of fly fishermen was also apparent from the

count data, which revealed that 38% of the anglers counted by the clerk were using flyfishing gear.

CONCLUSIONS

The Watauga River was described as underutilized during the 1998 creel survey (Bettoli 1999), but the pressure it received in 2002 was among the highest in Tennessee. Whereas anglers using bait numerically dominated the fishery in 1998, more anglers used artificial lures and flies than bait in 2002. The percentage of anglers using flyfishing gear more than doubled in 2002 and the percentage of anglers traveling from out-of-state to fish the river tripled in 2002. Higher fishing pressure and increased use of flyfishing gear were linked to the opening of a private campground and day-use area at the head of the Quality Zone.

The mean number of fish caught per angler per trip more than doubled between 1998 and 2002; whereas the mean harvest per angler fell by 70%. The incidence of catch-and-release fishing reported by anglers was very high in relation to the number of trout stocked each year and the number observed carrying over from year to year.

Perhaps the biggest change in the fishery since 1998 was the increase in guided fishing activity that was observed in 2002. The amount of guided fishing activity on the Watauga River is probably one of the highest in the state, but additional data are needed to confirm this preliminary conclusion.

The Watauga River trout fishery was one of three described by Hutt and Bettoli (2003) that was dominated by consumptive specialists and non-consumptive specialists. Anglers in both of these subgroups were very interested in the quality of the fisheries they visited and special regulations were accepted by a majority of them.

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Table 1. Fishing pressure and number of rainbow trout and brown trout caught and harvested by anglers fishing the Watauga River, Tennessee, March – October 2002. Mean catch-per-unit-effort rates based on interviews of parties that had been fishing at least 30 minutes.

Month	Pressure (hours)	SE	Rainbows Caught	SE	Rainbows Harvested	SE	Browns Caught	SE	Browns Harvested	SE	Mean CPUE
March	11,060	2,806	11,691	4,546	2,478	1,361	1,096	603	85	68	1.14
April	12,471	1,679	21,271	10,167	8,778	4,951	2,372	586	144	93	1.86
May	19,533	2,060	21,935	3,346	3,586	1,092	6,125	1,255	1,456	702	1.59
June	16,232	1,931	17,972	3,204	2,494	1,102	6,560	1,700	535	207	1.58
July	13,067	2,242	16,862	3,213	1,494	504	2,556	918	259	153	1.44
August	14,811	2,076	27,476	5,461	1,655	614	2,015	592	221	86	1.94
September	11,673	1,494	19,788	2,809	1,031	274	1,658	569	650	254	1.83
October	9,737	1,797	9,800	2,069	1,421	609	1,633	695	149	88	1.12
TOTAL	108,584	7,148	146,795	14,749	22,937	6,298	24,015	4,300	3,499	1,328	1.60

Table 2. Mean number of boats and trailers observed during instantaneous counts on the Watauga River, 2002. Sample size and standard errors are listed in parentheses. Boats include McKenzie-style drift boats, rafts, jon-boats, and canoes. "Trailers" included canoe racks on vehicles parked at boat ramps. Recreational rafters (i.e., not fishing) were not counted.

Month / Kind-of-Day	Boats	Trailers
March		
Weekday	1.57 (7; 0.78)	2.00 (7; 0.95)
Weekend	4.20 (5; 1.46)	6.00 (5; 0.28)
April		
Weekday	3.30 (10; 0.75)	5.30 (10; 0.90)
Weekend	4.00 (6; 1.32)	5.17 (6; 2.02)
May		
Weekday	2.30 (10; 0.52)	4.70 (10; 1.08)
Weekday	5.43 (7; 1.07)	9.43 (7; 1.65)
June		
Weekday	2.44 (9; 0.67)	3.22 (9; 0.78)
Weekend	5.38 (8; 1.38)	5.00 (8; 1.59)
July		
Weekday	1.40 (10; 0.60)	3.00 (10; 0.83)
Weekend	4.83 (6; 0.95)	5.00 (6; 1.37)
August		
Weekday	2.54 (11; 0.62)	4.82 (11; 1.20)
Weekend	2.20 (5; 0.66)	6.8 (5; 2.46)
September		
Weekday	1.70 (10; 0.50)	2.0 (10; 0.33)
Weekend	6.57 (7; 1.70)	9.00 (7; 2.28)
October		
Weekday	2.67 (12; 0.50)	4.08 (12; 0.81)
Weekend	5.33 (6; 1.98)	8.50 (6; 2.57)

Table 3. Number of trout observed in the creel (i.e., harvested) at each access area visited during the 2002 Watauga River creel survey, March-October. Note: Total lengths were not available for all fish observed in the creel.

Access Area	Rainbow Trout	Brown Trout
1. Wilbur Dam - to - Stony Creek	51	12
2a. Stony Creek - to – 19E bridge (right-bank- descending)	55	13
2b. Old Stoney Road - to – 19E (left-bank-descending)	3	2
3. 19E Bridge – to – Ballfield	43	78
4. VFW and vicinity	1	0
5. Blevins Bend and vicinity	298	19
6. Smalling Bridge and Campground	35	0
7. The Steps - to - Persinger Bridge and vicinity	3	1
8. Watauga Flats and vicinity	24	4

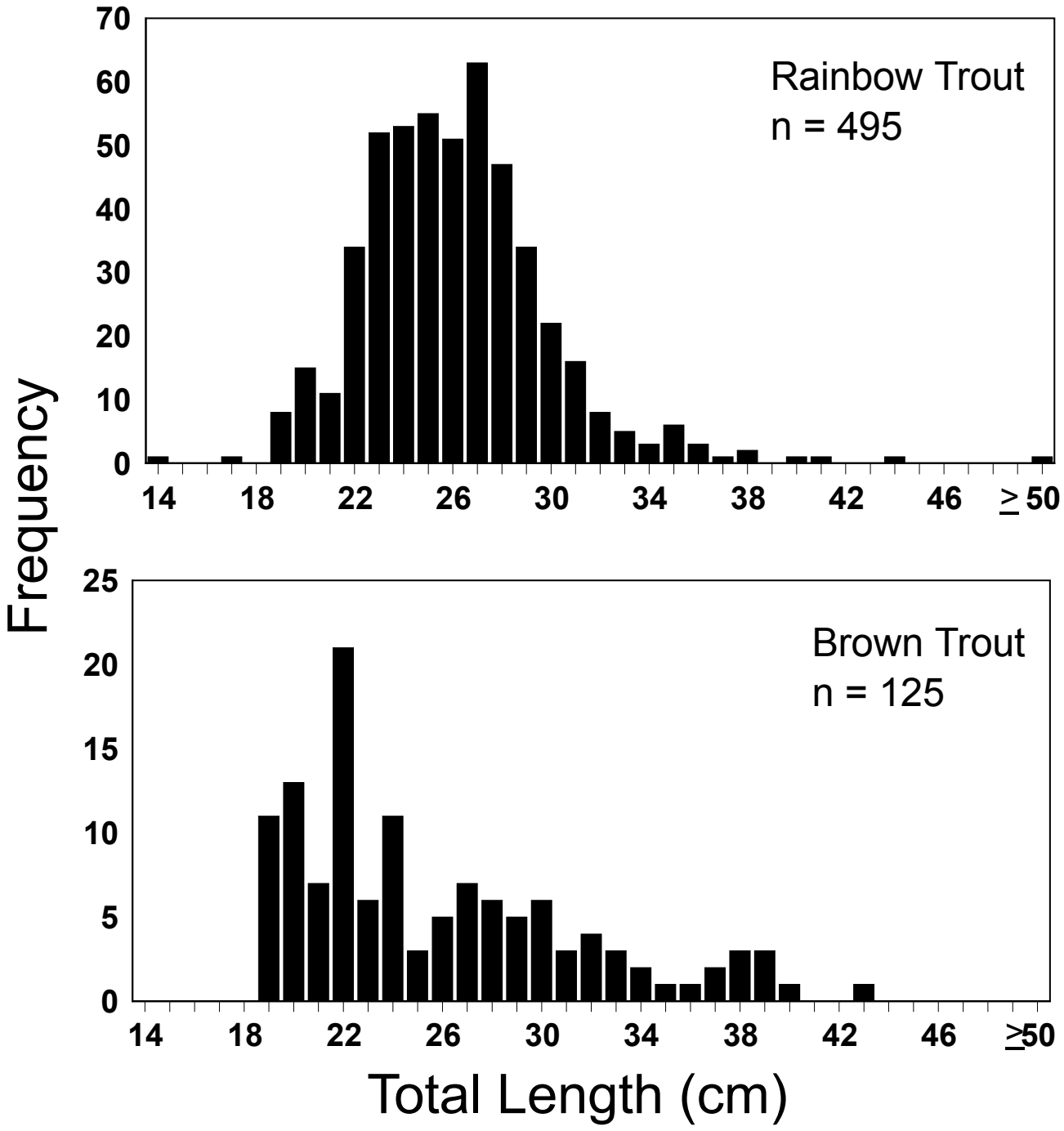

Figure 2. Length-frequency distributions for trout observed in the creel of anglers in the Watauga River, March - October 2002.

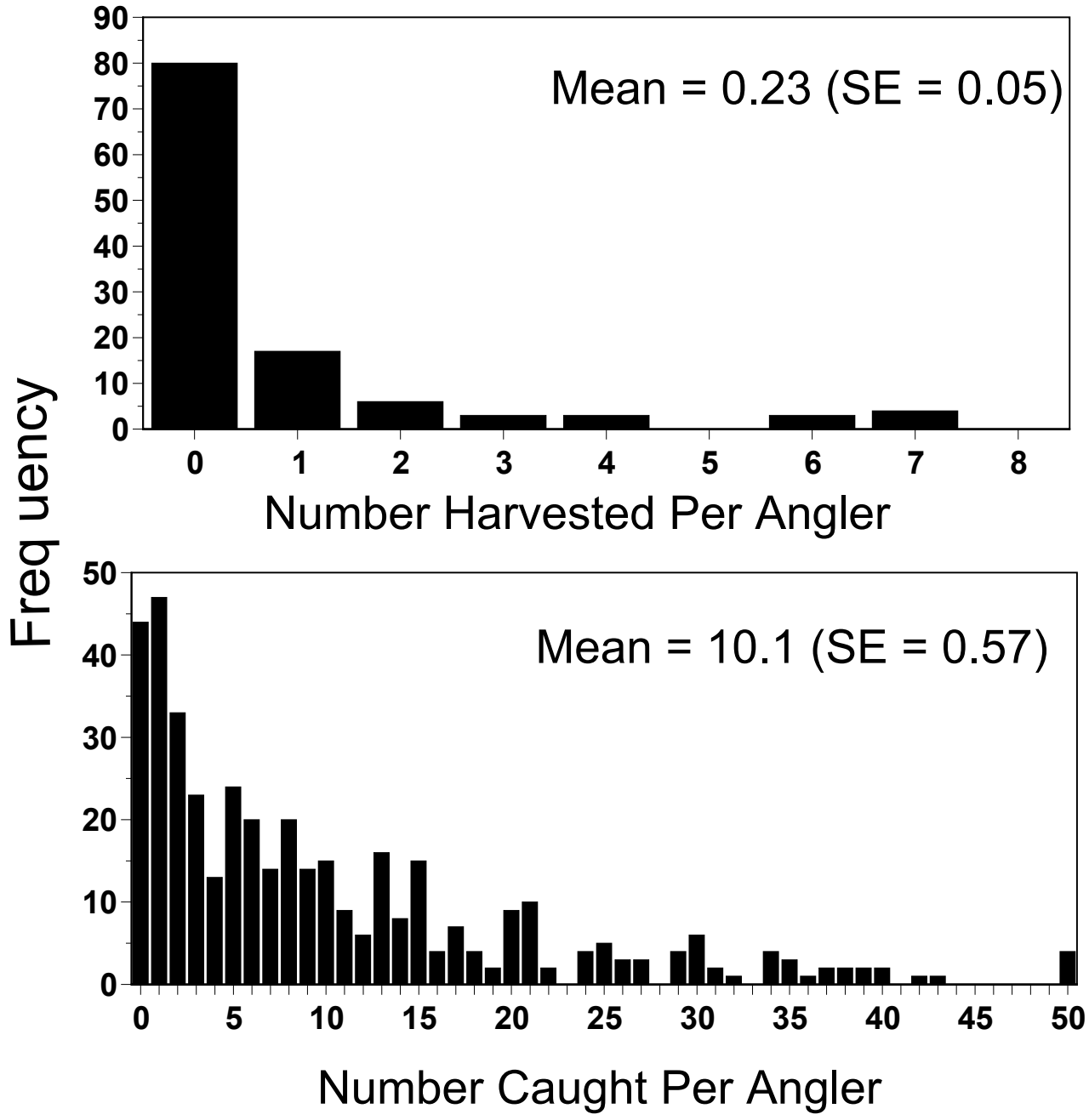

Figure 3. Frequency distribution for the average number of trout harvested and caught by each member of parties that had completed fishing when interviewed on the Watauga River, March - October 2002.
N = 409 parties

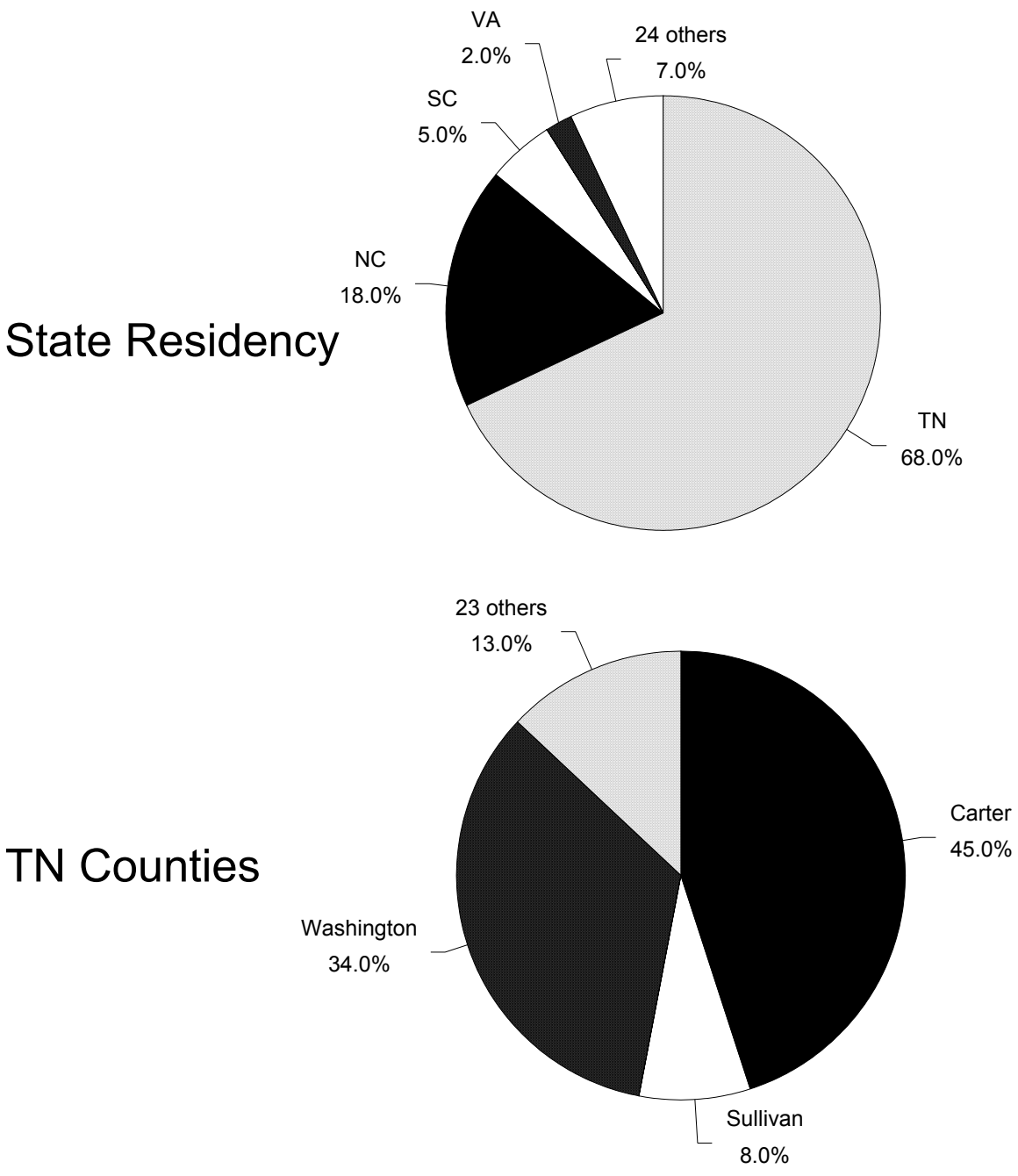

Figure 4. State residency and Tennessee county residency for anglers interviewed on the Watauga River, March - October 2002.

APPENDIX I

Survey forms used during the creel survey on the Watauga River, 2002

DAILY SHEET - WATAUGA 2002

Date (mm/dd/yr): _____ **Day Type:** _____

01 = Wk Day 02 = Weekend

Begin Time: _____ **End Time:** _____

River Stage: _____ 0 = No Generation 1 = Generation

	Anglers →					
Access Point:	**Spin**	**Fly**	**Cars**	**Boats**	**Trlr/Crs**	**Leg End Time**
1. Dam-to-Stony Creek						
2a. Stony Creek-to-19E						
2b. Brummit Island						
3. 19E-to-Ballfield						
4. VFW						
5. Blevins Bend						
6. Smalling Bridge						
7. Steps-to-Persinger						
8. Watauga Flats						
Totals:						
	Spin	**Fly**	**Cars**	**Boats**	**Trlr /Crs**	**Leg Time**

Adjusted Angler Count: (Leave Blank) _____

Daily Mileage / Time:

Begin Mileage: _____ **On-Station Time:** _____

End Mileage: _____ **Off-Station Time:** _____

INTERVIEW SHEET - WATAUGA RIVER 2002

DATE (mm/dd) _____ INTERVIEW NUMBER _____

KIND-OF-DAY _____ ACCESS POINT (1 - 8) _____
Weekday = 1 Weekend / holiday = 2 (River reach)

NUMBER IN PARTY _____

START OF FISHING _____ END OF FISHING _____
(MILITARY TIME) or time of interview) (MILITARY TIME)

Time Fishing Hours minutes .
By Party

COMPLETED TRIP ? _____ SPECIES FISHED FOR _____
Yes = 1 No = 2 Trout = 1; Any/Other = 2

Number of **Rainbows CAUGHT** = _____ Number of **Rainbows KEPT** = _____

Total Lengths of Rainbows Kept (nearest cm): _____

Number of **Browns CAUGHT** = _____ Number of **Browns KEPT** = _____

Total Lengths of Browns Kept (nearest cm): _____

Number of **Brookies CAUGHT** = _____ Number of **Brookies KEPT** = _____

Total Lengths of Brookies Kept (nearest cm): _____

For METHOD, TERMINAL GEAR, and LOCATION, the numbers entered in each line should equal the number in the party.

METHOD → STILLFISHING ____ SPINFISHING _____ FLYFISHING _____

TERMINAL GEAR → ARTIFICIAL LURES or FLIES _____ BAIT _____

LOCATION → BOAT _____ OTHER _____

STATE _____ AND COUNTY (Tennessee residents only) _____